

Claims

1. A method for continuously producing electronic film components in the form of transponders, with chip modules (5) being applied with their electrical connecting contacts (3) to antenna connections (2) of antenna film sections of an antenna film sheet (1), characterized in that the chip modules (5) with their backs facing away from the connecting contacts (3) are applied to adhesive film sections (7, 8), the base surfaces of which are substantially greater than the base surface of each chip module (5), that the electrical connecting contacts (3) of the chip modules (5) are electrically contacted with the antenna connections (2), and that the adhesive film sections (7, 8) are connected on the surfaces to the antenna film sections (1) such that the chip modules (5) are fixed in position relative to the antenna connections (2).

2. A method for continuously producing electronic film components in the form of chip module labels, the chip modules being applied with their backs to adhesive film sections, the base surfaces of which are substantially larger than the base surface of each chip module, and electrical connecting contacts of the chip modules being provided with contact tips in order to bring them in a subsequent operation into an electrically conductive connection with the antenna connections of an antenna structure of an antenna film section, characterized in that at least one antenna film section is part of a surface of packaging.

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3. The method according to claim 1 or 2, characterized in that an adhesive film sheet (7) that has been provided on one side with an adhesive coating (8) is provided continuously with the chip modules (5) at uniform distances and that subsequently the adhesive film sheet (7) is divided into individual adhesive film sections, each carrying a chip module (5).

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4. The method according to claim 3, characterized in that the adhesive film sheet (7, 7a) is divided into individual adhesive film sections prior to the electrical contacting of the chip modules (5) with the antenna connections (2).

5. The method according to any one of the preceding claims, characterized in that the contact tips of the electrical connecting contacts (3, 4) of the chip modules (5) are pressed mechanically into the electrically conductive antenna connections.

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6. The method according to claim 4, characterized in that the adhesive film sheet (7, 7a) and a protective film sheet (9a) are connected on their surfaces and wound onto a roll in the form a composite film sheet, that the composite film sheet is wound off the roll, and that the adhesive film sheet (7a) and the protective film sheet (9a) are pulled away from each other before applying the chip modules (5) and fed to different sheet paths.

7. The method according to claim 1, characterized in that the chip modules (5) that have been applied to the antenna

film sections of the antenna film sheet by means of the adhesive film sections, are wound onto a roll together with the antenna film sheet.

5 8. The method according to claim 2, characterized in that the chip modules applied to the adhesive film sheet are wound onto a roll together with the protective film sheet.

10 9. The method according to claim 7, characterized in that the electrical and/or electronic functions of the film components are inspected prior to winding the chip modules (5) together with the antenna film sheet (1).

15 10. The method according to any one of the preceding claims, characterized in that the electrical connecting contacts (3) of the chip modules (5) and/or the antenna connections (2) are provided with substantially pyramidal, hard and conductive particles (49) that are oriented such that the tips of the pyramids point in the direction of the corresponding connection.

20 11. The method according to claim 1, characterized in that prior to the electrical contacting of the electrical connecting contacts (3) of the chip modules (5) with the antenna connections (2) and prior to connecting the adhesive film sections (7, 8) to the antenna film sections (1), an adhesive is applied to the antenna film sections (1) that adhesive following the electrical contacting and the connection forms an adhesive coating,

the minimal expansion of which is defined by the boundary surfaces between the chip modules (5) and the antenna film sections (1) and the maximal expansion is defined by the boundary surfaces between the adhesive film sections (7, 8) and the antenna film sections (1).

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12. The method according to claim 1, characterized in that following the electrical contacting of the electrical connecting contacts (3) of the chip modules (5) with the antenna connections (2) and following the connection of the adhesive film sections (7, 8) to the antenna film sections, a support layer (31), particularly a silicone support layer, is applied to the antenna film sections (1), and/or a cover layer (28) is applied to the adhesive film sections (7, 8).

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13. An apparatus for carrying out the method according to at least one of the preceding claims, comprising a chip module station (12) on which the chip modules (5) are stored, as well as an adhesive film station (10, 24) on which the adhesive film sheet (7, 7a) is placed in roll form, a transfer station (15) provided on which the chip modules (5) are applied with the backs thereof individually to the adhesive surface side (8) of the adhesive film sheet (7, 7a), and wherein the distances of the chip modules (5) during application on the adhesive film sheet are selected such that an adhesive film section surrounding the associated chip module (5) has a considerably larger surface than the base surface of the respective chip module (5).

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14. The apparatus according to claim 13, characterized in that a contact preparation station (13, 13') is provided, on which the electrical connecting contacts of the chip modules receive contact tips.

15. The apparatus according to claim 13 or 14, characterized in that an antenna film station (19) is provided, on which the antenna film sheet (1) is fed in the wound state.

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16. The apparatus according to any one of claims 13 to 15, characterized in that a contacting station (18, 20) is provided for continuously mechanically contacting the electrical connecting contacts of the chip modules (5) with antenna connections (2) of antenna film sections of the antenna film sheet (1).

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17. The apparatus according to claim 16, characterized in that an adhesion station (18, 20) is provided, on which adhesive film sections protruding beyond the chip modules (5) are connected on the surfaces with the antenna film sections, with which the respective chip module (5) is electrically contacted.

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18. The apparatus according to any one of claims 13 to 17, characterized in that the width of the adhesive film sheet (7a) is greater than the width of the adhesive film sections.

19. The apparatus according to any one of claims 13 to 18, characterized in that at least one monitoring station (21) is provided, on which the functions of the transponders are inspected.

5 20. The apparatus according to any one of claims 13 to 19, characterized in that a connecting station (23) is provided, on which the antenna film sheet (1) as well as the chip modules (5) applied thereon and the adhesive film sections are wound onto a roll.

10 21. The apparatus according to any one of claims 13 to 20, characterized in that the transfer station comprises a separating unit (14) for separating the chip modules (5) as well as a turning station (15) for transferring the chip modules (5) with the respective back sides to the adhesive film sheet.

15 22. The apparatus according to any one of claims 13 to 21, characterized in that a separating station (25) is provided for separating the adhesive film sheet (7a) that is provided with the chip modules (5) into separate adhesive film sections.

20 23. The apparatus according to any one of claims 13 to 22, characterized in that a gluing station (34, 51) is provided, on which an adhesive (53, 54) is applied to the antenna film sheet (1) or to the protective film sheet (9a).

24. The apparatus according to claim 23, characterized in that the gluing station (34, 51) is provided in front of the adhesion and contacting stations (18, 2) of the chip modules (5) viewed in the belt conveying direction.

5 25. The apparatus according to claim 24, characterized in that the gluing station controls the application of adhesive such that adhesive surfaces are produced only in the area of the chip modules (5) on the antenna film sheet (1) of the protective film sheet (9a).

10 26. The apparatus according to any one of claims 13 or 25, characterized in that a support film station (37) is provided, on which the support layer (31) is fed in film form in the wound state.

15 27. The apparatus according to any one of claims 13 or 26, characterized in that a cover film station (39) is provided, on which the cover layer (28) is fed in film form in the wound state.

20 28. The apparatus according to claim 26 or 27, characterized in that a gluing station (35, 36) is provided, on which an adhesive is applied to the cover layer and/or to the support layer.

29. An electronic film component, particularly in the form of a transponder that can be produced using the method according to any one of claims 1 to 12.